Project-Based Learning in the 21st Century Science Classroom

Learning Guide—Blended Study Group Version

Use this guide as you progress through the course to organize your thoughts and to help you plan ways to apply the content you have learned in your building/district. At times, you may be prompted to refer to the Learning Guide for specific directions or activities. This course is structured using units, sections, and topics. For further explanation, please refer back to the online orientation.

As a convenience, this Learning Guide is provided in electronic format. To edit the document electronically, open it clicking the "Print" button onscreen and save the file locally to your computer; otherwise, any changes made to the document will be lost. Be sure to name the file appropriately when saving (i.e. **ParticipantName_ProjectBasedLearning_Learningguide.pdf**) and save the file in a folder where you keep other course documents, for easy retrieval later.

Throughout this course you will demonstrate an understanding of the course content and practice the skills discussed. There will be activities requiring planning, applying, reflecting, metacognition, and sharing.

Note that some activities will require that you submit responses electronically. All work can be created in a word processing program and can then be copied and pasted into the collection fields on-screen.

When viewing this document electronically, open the "Bookmarks" feature in your PDF viewing software to access the navigable Learning Guide Table of Contents. Using Adobe Reader, access the "Bookmarks" feature by selecting "View > Navigation Panels > Bookmarks", or by clicking on the small "Bookmark" image in the upper left corner of the main viewing pane.

As you progress through the course, be sure to:

- Read and listen to the information presented.
- Print and read additional materials as directed.
- Follow the Learning Guide closely as you progress through the multimedia portions of the course. It contains step-by-step instructions for all activities.
- Complete all activities, some of which require application in your building/district.
- Participate actively and frequently in all discussion activities.
- Add information to your Learning Log as directed, and at any other time you choose.
- Visit the "Links" section and navigate through the additional web resource links.
- Create a course resource binder for future reference by collecting all printed course materials and activities that will help you successfully complete the culminating activity.

Note: *Many articles are provided in podcast format for increased portability and to provide flexibility for different learning styles. However, learners are also encouraged to print out the articles to add to their resource binder for future reference.*

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UNIT 1: INTRODUCTION

The **ACTIVITY AND DOCUMENT BREAKDOWN** that appears at the beginning of every unit provides a complete list of all activities and documents in the course, as well as the recommended, approximate time for each activity. This will aid you in preparing and organizing your learning as you progress through the course. Use each breakdown as a checklist to ensure the completion of all activities and reading of all documents, or simply as a reference whenever questions arise.

Note that all documents are listed as bulleted, italicized items under the activity/screen from which they are printed, for you convenience when locating documents as you complete the course. Items denoted with a number within parenthesis **(07)** in the **Activity Number** column indicate that this particular activity appears, with directions, in this Learning Guide. This numbering is reflected in the naming convention of every activity throughout the Learning Guide, so that the **(07)** in the example below directly correlates with the item labeled **(07)** in the **UNIT 1 ACTIVITY AND DOCUMENT BREAKDOWN** below. Use this feature to easily identify where you are in the course at any time.

Example:

Course Activity (07):
Classroom Look-fors Precourse Self-assessment
Estimated Time: 15 minutes

UNIT 1 ACTIVITY AND DOCUMENT BREAKDOWN

Titles	Estimated Time	Objectives Identified	Activity Number
1.1.1 View Multimedia Segment: Course Overview	2 minutes	N/A	
1.1.1 Title screen • *Master Activity Time Breakdown* • *Project-Based Learning in the 21st Century Science Classroom*	2 minutes	N/A	
1.1.2 - 1.1.3 Review course overview and learning objectives	1 minute	N/A	
1.1.4 Project-Based Learning Classroom Look-fors	5 minutes	N/A	
1.1.5 Meet the Experts	N/A	N/A	
1.1.6 Course Materials • *Learning Guide* • *An Introduction to new INTERNET Literacies for Educators: Blogs, Wikis, RSS, Online Bookmarking* • *Range of Instructional Practice*	15 minutes	N/A	
1.1.6 Course Activity: Classroom Look-fors Precourse Self-assessment • *Project-Based Learning Classroom Look-fors Rubric*	15 minutes		(07)
1.1.6 Sync Point Discussion Activity (excluding Self-study version)	15 minutes	N/A	(08)

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Unit 1: Estimated Time Total	**55 minutes**	**Graduate, CPE, Blended Study Group Versions**
	40 minutes	**Self-study Version**

Section 1.1: Introduction
Topic 1.1.2: Course Overview

This course is divided into five units. The first unit is an introduction to the objectives, classroom look-fors, and materials of the course. In the second unit learners will focus on defining project-based learning in the 21st Century, exploring the scientific research base, the student and teacher experiences, and the role that assessment plays in project-based learning. In the third unit learners will explore the classroom look-fors related to project-based learning and will be provided opportunities for guided practice and individual performance with peer feedback. The fourth unit requires learners to engage in the action research cycle, including guided practice in each step. In the last unit, the completion of the culminating activity will occur, based on the collection of reflections and results from course activities.

The following is an estimate of the time it will take to complete each unit.

Unit 1	Unit 2	Unit 3	Unit 4	Culminating Activity	Total
55 minutes	6 hours & 36 minutes	8 hours & 22 minutes	11 hours & 3 minutes	3 hours	29 hours & 56 minutes

At the beginning of each unit in this Learning Guide, you will find the ACTIVITY AND DOCUMENT BREAKDOWN for that unit, which explains how much time each individual activity requires.

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Topic 1.1.3: Course Objectives

As a result of this course, you will be able to:

- Distinguish between what project-based learning is and is not.
- Define, generate, and identify a high quality 21st Century project-based lesson and resources.
- Formulate a Driving Question based on real world application that incorporates authentic assessment.
- Create a classroom culture of inquiry, independence, autonomy, and responsibility that models 21st Century skills.
- Utilize reflective practices to restructure projects and celebrate accomplishments.
- Understand the transformative possibilities of technology for teaching and learning in the project-based learning classroom.
- Embrace and implement technology as infrastructure to facilitate learning through communication, collaboration, journaling, researching, reflection, creating, presenting, and publishing.

Topic 1.1.4: Classroom Look-fors

The following look-fors, or evidence-based behaviors that positively impact student learning, can be used as guidelines for determining whether project-based learning is being implemented effectively. At the conclusion of this course, the following look-fors will be evidenced in your instruction:

- Teacher's project concept is standards-focused and well matched to student abilities, project experience, community involvement, and suitable time frame.
- Teacher's project plan is organized by a Driving Question that makes the project intriguing, complex, and problematic. The Driving Question requires multiple activities and synthesis of different information, and leads to authentic components of the project and assessment.
- Teacher implements and manages the project to encourage development of student independence, autonomy, and responsibility for mastering content and skills as defined by successful completion of the project.
- Students and teacher consider and discuss what has been learned during the project, celebrate accomplishments, and gain insight about how to improve their future performance.

Topic 1.1.6: Course Materials

Course Activity (07):
Classroom Look-fors Precourse Self-assessment
Estimated Time: 15 minutes

In this activity you will conduct a self-assessment of your current implementation of project-based learning.

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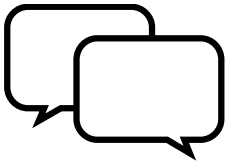
1. Print the *Project-Based Learning Classroom Look-fors Rubric*. Refer to the *Learning Log Rubric* at the end of Unit 1 when completing your Learning Log entries; keep in mind that this document will be used by the facilitator to score your participation.
2. Using the *Project-Based Learning Classroom Look-fors Rubric*, assess your current implementation of project-based learning.
3. In the table below, document your preassessment score. You will revisit these scores at the end of the course.

Look-for	Rubric Score
Project Concept	
Project Planning	
Project Implementation and Management	
Project Reflection	

4. Enter a summary of your preassessment in your **Learning Log** by clicking on "Resources" and then "Learning Log." Label your entry "Classroom Look-fors Precourse Self-assessment."
5. Close the Learning Log window to return to the course.

Personal Notes for Implementation:



Sync Point Discussion Activity (08):
Unit 1
Estimated Time: 15 minutes

In this activity you will participate in a discussion with the other members of your study group regarding the key concepts considered in this unit.

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1. The rubric your facilitator will use to provide feedback on Sync Point discussion activities appears in this Learning Guide at the end of Unit 1. Use this rubric for reference when completing the Sync Point activities throughout the course.
2. You will be notified when your facilitator has posted a topic for this discussion. You cannot complete this activity until he/she has done do. Be sure to check your "Inbox".
3. Open the discussion group by clicking on the "Course Resources" menu on the top left of the screen and select "Discussion."
4. On the discussion page, select the "Sync Point" discussion group and look for your facilitator's posting for Unit 1.
5. You must **post a response** to your facilitator's topic, and also either **reply** to the postings of others, or ask them questions. If you choose, you may start a new, related topic to discuss a specific concept in more detail. A study group discussion is a key element of the course, and much can be learned from participating.

6. Return to this discussion frequently to monitor the discussion and add your input.
7. Close the browser window to return to the course.

Personal Notes for Implementation:

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UNIT 1 RUBRIC(S)

RUBRIC FOR SYNC POINT DISCUSSIONS

	Performance Levels			
	Advanced	**Proficient**	**Emerging**	**Novice**
Frequency of Postings	Responds to the initial posting by facilitator and posts multiple replies to other group members' postings.	Responds to the topic posted by facilitator and posts 1 reply to other group members' postings.	Responds to the topic posted by facilitator or posts multiple replies to other group members' postings.	No postings.
Timeliness of Postings	Response to initial posting and multiple replies to other members' postings are done within specified time period.	Response to initial posting and reply to other member's postings are done within specified time period.	Response to initial posting or reply to other member's postings are done within specified time period.	Postings are not done during specified time periods.
Content of Postings	Responses are insightful, demonstrate a strong understanding of course concepts and definite application to practice.	Responses demonstrate a clear understanding of course concepts and some application to practice.	Responses relate to course concepts, but no elaboration. Evidence of possible misunderstandings.	Responses are not related to course concepts or no posting.

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LEARNING LOG RUBRIC

	Performance Levels			
	Advanced	**Proficient**	**Emerging**	**Novice**
Completeness	Completes all aspects of the activity with reflective responses.	Completes all aspects of the activity.	Completes some aspects of the activity.	Does not complete the activity.
Understanding of Course Content	Entry demonstrates a strong understanding of course concepts.	Entry demonstrates a clear understanding of course concepts.	Entry demonstrates some (limited) understanding of course concepts.	Entry demonstrates little or no understanding of course concepts.
Application of Course Content	Entry demonstrates definite and appropriate application of course concepts.	Entry demonstrates a clear application of course concepts.	Entry demonstrates limited evidence of application of course concepts.	Entry demonstrates little or no evidence of application of course concepts.

** The term "reflective response" involves going beyond the lower-level thinking indicated by a response such as: "Good idea, I agree." More appropriately, these responses should add to the discussion with a reference to research or studies, a personal education story, or the posing of an open-ended question.

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UNIT 2: PROJECT-BASED LEARNING IN THE 21ST CENTURY

UNIT 2 ACTIVITY AND DOCUMENT BREAKDOWN

Titles	Estimated Time	Objectives Identified	Activity Number
2.1.1 Course Activity: Project-Based Learning K-L-D Chart • *Planning Guide: An Explanation of the K-L-D Chart* • *Project Based Learning K-L-D Chart*	5 minutes	N/A	(9)
2.1.1 Multimedia Segment	4 minutes	1, 2	
2.1.1 Multimedia Segment	3 minutes	1, 2	
2.1.1 Course Activity: Introduction to Project-Based Learning • *Introduction to Project-Based Learning*	30 minutes	1, 2	(12)
2.1.1 Article Introduction • *Why is Project-Based Learning Important?*	5 minutes	1, 2	
2.1.1 Prediscussion Activity: Authentic Learning Activities	10 minutes	1, 2	(14)
2.1.1 Discussion Activity: Authentic Learning Activities	20 minutes	1, 2	
2.1.2 Multimedia Segment • Optional: *Project Based Learning as a Catalyst in Reforming High Schools* • Optional: *A Problem Based Learning Meta Analysis*	5 minutes	1, 2	
2.1.2 Multimedia Segment	3 minutes	1, 2	
2.1.2 Article Introduction • *What Research says About Project-Based Learning*	5 minutes	1, 2	
2.1.2 Prediscussion Activity: PBL Research Extension	10 minutes	1, 2	(19)
2.1.2 Discussion Activity: PBL Research Extension	20 minutes	1, 2	
2.1.3 Multimedia Segment	5 minutes	1, 2, 3, 4	
2.1.3 Article Introduction: • *How Does Project-Based Learning Work?*	5 minutes	1, 2	
2.1.3 Course Activity: Real Projects in a Digital World • *Real Projects in a Digital World*	20 minutes	1, 2, 6. 7	(23)
2.1.3 Web Research Activity: PBL and the 21st Century	20 minutes	1, 2, 6, 7	(24)
2.1.4 Multimedia Segment	3 minutes	1, 2	
2.1.4 Multimedia Segment	5 minutes	1, 2	
2.1.4 Multimedia Segment	5 minutes	1, 2	
2.1.4 Article Introduction • *New Skills for a New Century*	10 minutes	1, 2, 6, 7	

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2.1.4 Article Introduction • Optional: *Using Blogs in Education* • Optional: *Using Podcasts in Education* • Optional: *Using RSS in Education* • Optional: *Using Wikis in Education*	N/A	N/A	
2.1.4 Course Activity: The Nature of PBL	20 minutes	1, 2	(30)
2.1.5 View Multimedia Segment	2 minutes	1, 2	
2.1.5 View Multimedia Segment	5 minutes	1, 2	
2.1.5 Article Introduction • *Cougars, Curriculum, and Community*	15 minutes	1, 2	
2.1.5 Course Activity: Roles and Control	15 minutes	1, 2	(34)
2.2.1 Multimedia Segment	3 minutes	1, 2	
2.2.1 Multimedia Segment	3 minutes	1, 2	
2.2.1 Article Introduction • *Healthier Testing Made Easy: The Idea of Authentic Assessment*	10 minutes	1, 2	
2.2.1 Course Activity: Product and Artifact Identification	10 minutes	1, 2, 4	(38)
2.2.1 Web Research Activity: Product and Artifact Exploration	20 minutes	1, 2, 6, 7	(39)
2.2.1 Job Embedded Activity: Implementing a New Product or Artifact	20 minutes	1, 2, 6, 7	(40)
Sync Point Discussion (excluding Self-study Version)	45 minutes		(41)
Unit 2 Multiple Choice Questions (excluding Self-study Version)	10 minutes		
Unit 2 Essay Question (excluding Self-study Version)	25 minutes		
Unit 2: Estimated Time Total	**6 hours & 36 minutes**	**Graduate, CPE, Blended Study Group Versions**	
	5 hours & 16 minutes	**Self-study Version**	

Unit Overview

This unit focuses on project-based learning in the 21st century and will provide the foundation for the rest of the course. This unit begins with development of a definition of Project-based learning, or PBL. The Buck Institute for Education, as explained by Dr. John Mergendoller and John Larmer, will provide expert commentary on the key vocabulary and principles of project-based learning, and will explain why PBL is effective based on fundamental research. Best practices for project-based learning will be introduced, and supplemented by teacher and student testimonials of the benefits and challenges of PBL. Finally, the relationship between project-based instruction and authentic assessment will be established. Throughout this unit, you will consider your current and future use of technology to promote higher order thinking skills.

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Section 2.1: Project-Based Learning in the 21st Century
Topic 2.1.1: What is 21st Century Project-Based learning Instruction?

Course Activity (9):
Project-Based Learning K-L-D Chart
Estimated Time: 5 minutes

In this activity you will reflect on your current knowledge of project-based learning.

1. Print the *Planning Guide: An Explanation of the KLD Chart* and the *Project-Based Learning K-L-D Chart*.
2. Complete the "K" column of the chart, recording what you already know about the topic.
3. Save the chart for later use. You will be directed when to fill in the "L" and "D" columns.
4. Return to the course to continue.

Personal Notes for Implementation:

Course Activity (12):
R-C-Q Journal: *Introduction to Project-Based Learning*
Estimated Time: 30 minutes

In this activity, you will read and reflect on a course document that introduces project-based learning. To aid in information processing, you will select ideas and quotes from the text and then react to, connect with, and/or question the text by recording responses in the R-C-Q Journal.

1. Print or download *Introduction to Project-Based Learning*.
2. While reading or listening to the article, record ideas or quotes from the text that elicit a reaction, connection, or question from you in the left column of the R-C-Q Journal.
3. Record your reactions, connections, or questions in the right column.
4. Continue this process throughout the article.

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R-C-Q Journal (**R**eact, **C**onnect, **Q**uestion)	
Idea or **Quote** (from the text)	**Reactions**/**Connections** to, or **Questions** regarding, the text

5. After completing the article and journal, respond to the following questions:

   a. What was the most important idea or insight you gained from the article?

   b. What is your overall reaction to the information presented in this article? Will the information be useful to you?

   c. What unanswered questioned do you still have?

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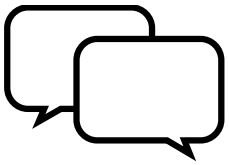
6. Return to the course.

Personal Notes for Implementation:



Prediscussion Activity (14):
Authentic Learning Activities
Estimated Time: 10 minutes

In this activity, you will consider project-based learning as an instructional approach relying heavily on authentic learning activities that engage student interest and motivation. You will utilize the "Characteristics of Authentic Learning Activities" tool to gauge and document your current implementation level. This activity will prepare you for an online discussion.

1. Complete the "Characteristics of Authentic Learning Activities" tool found below. Indicate authentic learning characteristics that you currently implement and describe that use (or opportunities for future use).

Characteristics of Authentic Learning Activities		
Characteristic	**Currently evident - Yes or No**	**Current Use or Opportunities for Implementation:**
Real-world relevance		
Ill-defined (problems with no clear answer, requiring critical thinking to solve)		

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Complex, sustained tasks		
Multiple perspectives		
Collaboration		
Value-laden		
Interdisciplinary		
Authentically assessed		
Authentic products		
Multiple possible outcomes		

2. When you have completed the tool, consider the following questions to help drive your online discussion:

    a. What is the defining characteristic that connects project-based learning and authentic instruction? Please describe.

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b. Describe your perceived benefit of 'ill-defined' problems in project-based learning. Please provide your rationale.

c. How can having multiple possible outcomes enhance the student experience in project-based learning?

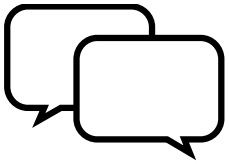
d. What contributions can technology offer to authentic learning and instruction?

3. For the purpose of the online discussion, summarize your responses in the space provided.

4. Return to the course and advance to the next screen in order to receive further instructions for the online discussion activity.

Personal Notes for Implementation:

Topic 2.1.2: What is the Research Base for 21st Century Project-Based Learning?



Prediscussion Activity (19):
PBL Research Extension
Estimated Time: 10 minutes

In this activity you will reflect on and consider the implications from your research in the classroom. This activity will prepare you for an online discussion.

1. Consider the following questions, using the space provided below to note any initial ideas.

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a. What impact does the provided research have on your view of PBL? What preconceptions were affirmed? Which misconceptions were debunked? Please describe.

b. Based on the research, describe the relationship between PBL and standardized tests. How do you explain the increase/decrease in achievement?

c. How would you answer the following question if posed by your building's principal: Does PBL work?

2. For the purpose of the online discussion, summarize your most important findings related to the PBL research base in the space provided.

3. Return to the course and advance to the next screen in order to receive further instructions for the online discussion activity.

Personal Notes for Implementation:

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Topic 2.1.3: What are the Best Practices for 21st Century Project-Based Learning?

Course Activity (23):
R-C-Q Journal: *Real Projects in a Digital World*
Estimated Time: 20 minutes

In this activity, you will read and reflect on a course document that makes the connection between PBL and technology, while addressing the evolving roles of both learners and leaders. To aid in information processing, you will select ideas and quotes from the text and then react to, connect with, and/or question the text by recording responses in the R-C-Q Journal.

1. Print or download the document, *Real Projects in a Digital World*.
2. While reading or listening to the article, record ideas or quotes from the text that elicit a reaction, connection or question from you in the left column of the R-C-Q Journal.
3. Record those reactions, connections, or questions in the right column.
4. Continue this process throughout the article.

R-C-Q Journal (**R**eact, **C**onnect, **Q**uestion)	
Idea or **Quote** (from the text)	**Reactions**/**Connections** to, or **Questions** regarding, the text

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5. After completing the article and journal, respond to the following questions:

   a. What was the most important idea or insight you gained from the article?

   b. What is your overall reaction to the information presented in this article? Will the information be useful to you?

   c. What unanswered questions do you still have?

6. Return to the course to continue.

Personal Notes for Implementation:

Web Research Activity (24):
PBL and the 21st Century
Estimated Time: 20 minutes

In this activity you will perform web research for the purpose of connecting 21st Century skills and project-based learning. This will be accomplished by reviewing PBL websites and considering the powerful role that technology can play in Project-based learning.

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1. Click to open a search engine that will display a list of websites that relate to "flat classroom projects."
2. Identify and investigate at least two sites which will allow you to consider how technology facilitates projects and adds value for the learner.
3. Using the following questions to guide you, create a tool, checklist, or summative explanation for new teachers focusing on higher level technology infusion (revisit the *Range of Instructional Use* document provided in this course) and 21st Century skills.

    a. Using technology, how is communication facilitated student-to-teacher, student-to-student, and teacher-to-class?
    b. How does technology capture and ease the unfolding work, including planning, analyzing, collaborating, communicating, creating, publishing, and presenting?
    c. Considering that PBL is not a linear process and involves the following of established design principles, which principle would you argue is the most critical, and why?
    d. How does PBL align with 21st Century skills? How can this be emphasized?
    e. How does using digital tools emulate real-world activities, and what tools do you feel accomplish this most effectively?

4. As an optional extension of this activity, post your work to the "Sharespace" tool. If you are unfamiliar, the tool can be accessed through your "Discussion" tab in the course resources area. Detailed directions are located in the "Help" section, which can be accessed from the "Discussion" tab and/or from the Learner Console screen (from which you access and launch the course). Please keep in mind that even if you do not share your personal results, you are free to comment on those of your peers.
5. In the space provided, prepare your tool, checklist, or summative explanation of technology and 21st Century skills related to "flat classroom projects."

6. Return to the course.

Personal Notes for Implementation:

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Topic 2.1.4: What Is the Student Experience?

Course Activity (30):
The Nature of PBL
Estimated Time: 20 minutes

In this activity, you will identify the physical manifestations of technology-infused PBL using the provided tool.

1. Complete the following tables:

What does the student experience in PBL LOOK like?			
Behavior	**Personal Classroom Example**	**Ideas/Current Practices for Fostering Behavior**	**Technology Infused Ideas for Fostering Behavior**
Collaboration and Team Work			
Practicing Critical Thinking and Problem Solving Skills			
Oral Communication and Presentation Skills			
Developing Civic and Global Responsibility			
Career Exploration			
Focus Content and Conduct Research			

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Time Management			

What does the student experience in PBL SOUND like?			
Behavior	**Personal Classroom Example**	**Ideas/Current Practices for Fostering Behavior**	**Technology Infused Ideas for Fostering Behavior**
Collaboration and Team Work			
Practicing Critical Thinking and Problem Solving Skills			
Oral Communication and Presentation Skills			
Developing Civic and Global Responsibility			
Career Exploration			
Focus Content and Conduct Research			
Time Management			

Adapted from Tahoma School District; checklist by Arthur L. Costa
(http://www.tahoma.wednet.edu/teachlearn/perfinquis.htm)

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2. Respond to the following reflection questions:

   a. Using the *Range of Use Chart*, plot your technology-infused ideas where they fit most appropriately. Is your technology use mainly for productivity, or are you reaching the higher order thinking levels?

   b. How can you take your ideas from the productivity level to the higher levels of technology use? What value will this add to your instruction?

3. Consider your current and future use of higher level technology-infused ideas, and the physical manifestations of these activities in the classroom. Enter your thoughts in your **Learning Log** by clicking on "Resources" and then "Learning Log." Label your entry "The Nature of PBL."
4. Close the Learning Log window to return to the course.

Personal Notes for Implementation:

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Topic 2.1.5: What is the Teacher Experience?

Course Activity (34):
Roles and Control
Estimated Time: 15 minutes

In this activity, you will reflect on the concepts of roles and control in the PBL classroom.

1. Review the following tables. During your review, consider where your current instruction fits on the continuum. Keep in mind that depending on individual teacher readiness and class comfort levels, the more advanced column on the right may not necessarily be "better."

Project Design and the Students' Role:

Limited Student Input **Maximum Student Input**

Teacher selects topics	Teacher solicits student input	Students select topic; teacher facilitates and retains veto power.
Teacher defines learning outcomes	Teacher and students negotiate learning outcomes	Students define learning outcomes; teacher facilitates and retains veto power.

Project Activities and the Students' Role:

Limited Student Autonomy **Maximum Student Autonomy**

Teacher defines products and activities	Teacher solicits Student Input	Students define products and activities; teacher facilitates and retains veto power.
Teacher controls timeline and pace of project		Students determine timeline and pace of project; teacher facilitates and retains veto power.

2. Respond to the following reflection prompts:

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a. Describe opportunities that you currently provide that allow your students to exercise responsibility and choice.

b. In terms of readiness, describe your use of the PBL management skills as described in this course.

c. Describe the relationship between student readiness and the concept of maximizing student input/autonomy? Is maximizing student input always better? Please provide rationale for your answer.

d. What general observations can you make about the current readiness level and confidence of both you and your students in regard to PBL?

e. What plans do you have for increasing your students' readiness? What activities would be appropriate?

3. Providing your rationale, give an honest assessment of your readiness for PBL, and that of your students. Enter your thoughts in your **Learning Log** by clicking on "Resources" and then "Learning Log." Label your entry "Roles and Control."

4. Close the Learning Log window to return to the course.

Personal Notes for Implementation:

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Section 2.2: Assessment and Project-Based Learning

Topic 2.2.1: What Relationship Exists Between Assessment and 21st Century Project-Based Learning?

Course Activity (38):
Product and Artifact Identification
Estimated Time: 10 minutes

In this activity, you will analyze a list of products and artifacts to determine what additions or adaptations you might consider in your own classroom.

1. Review the following collections of product and artifact types to see which could be adopted or adapted for use in your classroom.

EXAMPLES OF MULTIPLE PRODUCTS

Written Products	Presentation Products	Media Products
• Blog • Wiki • Online Journal • Online Collaborative Word Processing (i.e., a "Google Shared Document") • Spreadsheet • Research Report • Narrative • Letter • Poster • Brief • Proposal • Poem • Outline • Brochure • Pamphlet • Survey • Autobiography • Essay • Book Review • Report • Editorial • Movie Script	• Screencast (digital recording of computer screen output) • PowerPoint, Keynote, or other MM Presentation • Annotated Map (i.e., Google Earth/Google Map): Journey of Artifacts, including where they were found, used, and by whom • Speech • Debate • Play • Song/Lyric • Musical Piece • Oral Report • Panel Discussion • Dramatic Reenactment • Newscast • Discussion • Dance • Proposal • Data Display • Exhibition of Products	• Podcast • Vodcast • Screencast • Mashup (combination of various products, screencasts, maps, etc. used to create an animated, interactive product) • Audiotape • Slide Show • Video • Drawing • Painting • Sculpture • Collage • Map • Scrapbook • Oral History • Photo Album

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Training Products	Planning Products	Construction Products
• 3-D Simulation Program (i.e., "Sketch-Up") • Program • Manual • Working Model	• Concept Mapping Software • Proposal • Estimate • Bid • Blueprint • Flow Chart • Timeline	• 3-D Wiring/Designing Software • Computer Animation Software • Physical Model • Consumer Product • System • Machine • Scientific Instrument • Museum Exhibit • Diorama

*Table created by John Thomas with technology focus added by Pamela Livingston.

EXAMPLES OF ARTIFACTS

Products that Reveal Process Steps		
• Blogs (including main posts and comment posts) • Wikis • Online Journals • Twitter (microblogging) • Chats (logged online conversations) • Threads in Social Networking Sites (i.e., Ning *)	• Notes • Journal Entries • Descriptions of Activities • Library Search Record • E-mail Records • Telephone Logs • Purchase Receipts	• Conversations • Minutes of Meetings • Telephone Bills • Discarded Ideas • Prototypes • Group Process Reports • Samples
* Ning is a completely free social network which has been successfully implemented as a learning community. Ning allows chatting, sharing, online collaboration, etc. Teachers can have advertising removed from their Ning if they send an email saying they are using it in school with students.		

*Table created by John Thomas with technology focus added by Pamela Livingston.

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EXAMPLES OF TECHNOLOGY TOOLS THAT ENHANCE PBL

Function/ Component	Tool	Use/Benefit
Artifact Collection	Spreadsheets, Online Databases	• To collect, categorize, and annotate artifacts for subsequent evaluation and assessment
Artifact Analysis	Spreadsheets, Online Databases, Search Engines, Online Primary Source Material	• To compare artifacts to one another • To research use of artifacts • To investigate databases and primary source materials for how artifacts were used authentically
Journaling for Metacognitive Reflection and Assessment (formative/ summative)	Blogs, Wikis, Learning Management Systems (if they exist), Ning	• When students journal their process, ideas, and research, they are metacognitively examining their own thinking. This deepens their higher order thinking skills, allows subsequent formative and summative assessment by the student or teacher, and creates a record of ideas. • The arc of learning becomes evident in the journal, and when done electronically and online, offers a product. Students can return to their electronic journals and examine their own initial ideas, the process they followed, and their end result. • Other students can share and collaborate on their thinking and their processes.

**Table created by Pamela Livingston.

2. Respond to the following reflection prompts:

   a. Which products and artifacts do you use most often in your current projects?

   b. At what point in the process do you collect the various products?

   c. How do you use these products to make student thinking visible and to reach the higher order of thinking?

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d. List three products and artifacts that piqued your interest, and about which you would like to learn more. You will explore these further in a future activity.

e. How have you (or will you) use technology for student and teacher journaling, for analysis, for collaborating, and to create a record for formative and summative assessment of the project?

3. Return to the course.

Personal Notes for Implementation:

Web Research Activity (39):
Product and Artifact Exploration
Estimated Time: 20 minutes

In this activity you will use a search engine to explore previously identified products and artifacts that you would like to learn more about and incorporate into future products.

1. Click to open a search engine that you can use to explore products and artifacts. Simply enter the product or artifact (i.e., "twitter") into the search engine individually and identify credible resources.
2. In the space provided, write notes on what you learned about each product:

   a. **Product/Artifact 1:**

   b. **Product/Artifact 2:**

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c. **Product/Artifact 3:**

3. Respond to the following reflective prompts:

   a. How do you envision incorporating the identified artifacts into your classroom?

   b. How might technology facilitate consideration/analysis/use/evaluation of these products and artifacts for your students?

   c. How will students begin and define their Web search?

   d. How will students evaluate their Web results against other material?

4. Return to the course to continue.

Personal Notes for Implementation:

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Job-embedded Activity (40):
Implementing a New Product or Artifact
Estimated Time: 20 minutes

In this activity you will develop and implement an action plan for a product or artifact that you researched. The implementation *must* include higher level technology infusion as described in the *Range of Use* chart provided earlier in this course.

1. Using the space below, identify and develop a plan for implementing your selected artifact or product:

   Product or Artifact:

   Project Description:

   Intended Use (be specific):

2. Implement the product or artifact in your classroom.
3. Reflect on your implementation:

   a. What successes did you have?

   b. What challenged you during the implementation?

   c. What did you learn from the experience?

4. As an optional extension of this activity, post your work to the "Sharespace" tool. If you are unfamiliar, the tool can be accessed through your "Discussion" tab in the course resources area. Detailed directions are located in the "Help" section, which can be accessed from the "Discussion" tab and also from the Learner Console screen (from which you access and launch the course). Please keep in mind that even if you do not share your personal results, you are free to comment on those of your peers.
5. Fill in the "L" and "D" columns of your *Project-Based Learning K-L-D Chart*.
6. Return to the course to continue.

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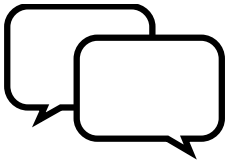
Personal Notes for Implementation:



Sync Point Discussion Activity (41):
Unit 2
Estimated Time: 45 minutes

Now that you have reached the end of this unit, you will take part in a sync point discussion with other members of your study group. There are two different ways this can occur:

1. **Option 1 (preferred):** Your study group will be asked to meet for a 1 hour face-to-face meeting with your facilitator, or
2. **Option 2:** Your study group will have an online sync point discussion.

Your facilitator will contact you to let you know which option you are using for the end of this unit. Once you are notified, please follow the corresponding instructions below:

Option 1 Instructions: Face-to Face Sync Point Meeting

This option will have you meet with your study group members and your facilitator for a 1 hour face-to-face meeting. For this meeting, be prepared to discuss with the group:

a. Research findings - as well as the teacher and student experience - illustrate the transforming power of differentiated instruction. As you reflect upon the course activities from Unit 2, identify the challenges and benefits you and your students might face by teaching with a differentiated philosophy.
b. Please also describe where higher order technology fits into differentiated instruction.
c. What have you learned and what insights gained from this unit?
d. What unanswered questions have been raised in your mind?

Your facilitator will let you know where and when this meeting will occur. Follow his/her instructions. Be sure to participate conscientiously, as part of your course grade will be based on your contribution to this discussion.

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Option 2 Instructions: Online Sync Point Discussion

This option will have you discuss topics from this unit with others in your study group online.

1. You will be notified when your facilitator has posted a topic for this discussion. You can not complete this activity until he/she has done so. Be sure to check your Inbox regularly.
2. Open the discussion group by clicking on the "Course Resources" menu on the top left of the screen and selecting "Discussion."
3. In the discussion page, select the "Sync Point" discussion group and look for your facilitator's posting for Unit 2.
4. You must post a response to your facilitator's topic and also either reply to the postings of others, or ask them questions. If you choose, you may start a new, related topic to discuss a specific concept in more detail. A study group discussion is a key element of the course and much can be learned from participating. Part of your grade will be based on the quality and frequency of your participation in these discussions.
5. Return to this discussion frequently to monitor the discussion and add your inputs. Bear in mind that the quiz at the end of the unit will in part be based on this discussion.
6. Close the browser window to return to the course.

Personal Notes for Implementation:

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UNIT 2 RUBRIC(S)

	Performance Levels			
	Advanced	**Proficient**	**Emerging**	**Novice**
Description of How PBL Is Effective, Based on Research Findings	Provides a highly detailed description of the effectiveness of PBL, citing multiple examples and data from the research findings. The relationship between the research and the rationale for PBL is clearly articulated.	Provides a highly detailed description of the effectiveness of PBL, citing multiple examples and data from the research findings. The relationship between the research and the rationale for PBL, however, is not clearly articulated.	Provides a brief description of the effectiveness of PBL, citing an example or piece of data from the research findings.	Provides a brief description of the research base, but provides no specific examples or connections between the research base and PBL.
Examples of How PBL Prepares Students for the 21st Century Workplace	Offers a clear and convincing explanation of how at least three examples illustrate the skills of effective communication, problem solving, and higher order technology use.	Offers a clear and plausible explanation of how at least two examples illustrate the skills of effective communication, problem-solving, or higher order technology use.	Offers a questionable explanation of—or only alludes to—the connection between at least one example and the skills of effective communication, problem-solving, or higher order technology use.	No examples offered, no explanation provided, or only faulty explanation provided for the connection to the skills of effective communication, problem-solving, or higher order technology use.
Explanations or Detailed Descriptions of How PBL and Assessment are Currently Used in Instructional Practice	Detailed description of how (a) specific instructional activities, (b) assessment assignments to students, and (c) teachers' criteria for evaluating student performance reflect specific PBL standards.	Detailed description of how two of (a), (b), or (c) reflect specific standards for PBL.	General—though not detailed—description of how two of (a), (b), or (c) reflect specific standards for PBL.	No description of how (a), (b), and/or (c) reflect specific standards for PBL.

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Examples of How Components of PBL and Higher Order Technology Will Be Incorporated into Future Lessons	Taken together, the examples clearly reflect all of the four principles of PBL. Higher order technology effectively aligns with the *create* and *evaluate* designations in the *Range of Instructional Practice* chart.	Taken together, the examples clearly reflect at least three of the four principles. Higher order technology use is approaching alignment with the *create* and *evaluate* designations in the *Range of Instructional Practice* chart.	Examples may reflect two or more of the four principles, but the connection is not clear. Higher order technology use aligns with the *apply* and *analyze* designations in the *Range of Instructional Practice* chart.	Most of the examples are unlikely to reflect any of the four principles. Higher order technology use aligns with the *remember* and *understand* designations of the *Range of Instructional Practice* chart.
Conventions	Excellent evidence of correct spelling, grammar, mechanics, usage, and sentence formation—no more than two errors.	Adequate evidence of correct spelling, grammar, mechanics, usage, and sentence formation—no more than five errors.	Some evidence of correct spelling, grammar, mechanics, usage, and sentence formation—no more than 10 errors.	Limited evidence of correct spelling, grammar, mechanics, usage, and sentence formation—more than 10 errors.

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UNIT 3: GUIDED PRACTICE TO PROJECT-BASED LEARNING IN THE 21ST CENTURY

UNIT 3 ACTIVITY AND DOCUMENT BREAKDOWN

Titles	Estimated Time	Objectives Identified	Activity Number
3.1.1 Multimedia Segment	3 minutes	4	
3.1.1 Course Activity: Look-for Video Review Guide: Project Concept	10 minutes	1, 2, 3, 4	(45)
3.1.1 Look-for Video: Project Concept	5 minutes	1, 2, 3, 4, 5, 6, 7	
3.1.1 Multimedia Segment	3 minutes	1, 2, 3, 4, 5, 6	
3.1.1 Article Introduction • *Begin with the End in Mind*	15 minutes	1, 2, 3	
3.1.1 Prediscussion Activity: Project Scope	10 minutes	1, 2, 3, 4	(49)
3.1.1 Discussion Activity: Project Scope	20 minutes	1, 2, 3, 4	
3.1.1 Multimedia Segment	3 minutes	1, 2, 3, 4	
3.1.1 Course Activity: Know and Need to Know	10 minutes	1, 2, 3	(52)
3.1.2 Multimedia Segment	4 minutes	1, 2, 3, 4	
3.1.2 Course Activity: Look-for Video Review Guide: Project Plan	10 minutes	1, 2, 3, 4	(54)
3.1.2 Look-for Video: Project Plan	5 minutes	1, 2, 3, 4, 5, 6, 7	
3.1.2 Multimedia Segment	3 minutes	1, 2, 3, 4, 5, 6, 7	
3.1.2 Article Introduction • *Craft the Driving Question*	10 minutes	1, 2, 3, 4	
3.1.2 Course Activity: Crafting a Driving Question	20 minutes	1, 2, 3, 4	(58)
3.1.2 Job-Embedded Activity: Driving Question Extended	20 minutes	1, 2, 3, 4	(59)
3.1.2 Multimedia Segment	4 minutes	1, 2, 3, 4	
3.1.2 Article Introduction: • *Plan the Assessment*	15 minutes	1, 2, 3, 4, 5, 6	
3.1.2 Prediscussion Activity: Rubric Review	20 minutes	1, 2, 3, 4	(61)
3.1.2 Discussion Activity: Rubric Review	20 minutes	1, 2, 3, 4	
3.1.3 Multimedia Segment	3 minutes	1, 2, 3, 4, 5, 6, 7	
3.1.3 Course Activity: Look-for Video Review Guide: Project Implementation and Management	10 minutes	1, 2, 3, 4	(64)
3.1.3 Look-for Video: Project Implementation and Management	5 minutes	1, 2, 3, 4, 5, 6, 7	
3.1.3 Multimedia Segment	3 minutes	1, 2, 3, 4	
3.1.3 Article Introduction: • *Map the Project*	15 minutes	1, 2, 3, 4	

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3.1.3 Course Activity: Sample Entry Document	15 minutes	1, 2, 3, 4	(68)
3.1.3 Article Introduction: • *Manage the Process*	10 minutes	1, 2, 3, 4	
3.1.3 Job-Embedded Activity: Classroom Management Implementation • *Project Calendar*	50 minutes	1, 2, 3, 4, 5, 6, 7	(70)
3.1.4 Multimedia Segment	3 minutes	1, 2, 3, 4, ,5, 6	
3.1.4 Course Activity: Look-for Video Review Guide: Project Reflection	10 minutes	1, 2, 3, 4	(72)
3.1.4 Look-for Video: Project Reflection	5 minutes	1, 2, 3, 4, 5, 6, 7	
3.1.4 Multimedia Segment	3 minutes	1, 2, 3, 4, 5, 6, 7	
3.1.4 Article Introduction: • *Plan for Evaluation and Reflection*	10 minutes	1, 2, 3, 4, 5, 6, 7	
3.1.4 Course Activity: Planning for Evaluation and Reflection • *The Fishbowl Method* • *End of Project Self-assessment*	20 minutes	1, 2, 3, 4, 5	(76)
3.1.5 Multimedia Segment	5 minutes	1, 2, 3, 4, 5, 6,7	
3.1.5 Course Activity: Project Plan	45 minutes	1, 2, 3, 4, 5, 6, 7	(78)
3.1.5 Sync Point Discussion (excluding Self-study Version)	45 minutes		(79)
3.1.5 Unit 3 Multiple Choice Questions (excluding Self-study Version)	10 minutes		
3.1.5 Unit 3 Essay Question (excluding Self-study Version)	25 minutes		
Unit 3: Estimated Time Total	**8 hours & 22 minutes**	**Graduate, CPE, Blended Study Group Versions**	
	7 hours & 15 minutes	**Self-study Version**	

Unit Overview

In this unit, you will explore project-based learning in the technology enriched 21st Century classroom environment. This unit contains discipline specific content. The look-for content will be presented in a consistent format. For each identified look-for, there will be a multimedia introduction and discipline-specific articles. You will then reflect on the articles and watch look-for videos. Candid teacher testimonials provide an authentic peer connection. Where appropriate, higher level technology use and real world application will be a requirement for the job-embedded activities.

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Section 3.1: Implementing Project-Based Learning in the 21st Century
Topic 3.1.1: How Do I Develop the Project Concept?

Course Activity (45):
Look-for Video Review Guide: Project Concept
Estimated Time: 10 minutes

In this activity you will review the look-for video on project concept; then, reflect on your level of application of the classroom look-for indicators.

1. Read all the questions and instructions in this activity before beginning the activity. When prompted in the activity directions below, you will return to the course to view the look-for video. While viewing the video, you will complete item #2 below. After viewing the video, you will complete the remaining items for this activity in your Learning Guide.
2. As you watch the classroom look-for video, complete the "Project Concept Video Review" table. Add notes to the "Personal Observations" column, identifying what the teacher and/or students are doing or saying that supports each evidence statement.

Evidences	Personal Observation
Teacher encourages exploration of research beyond the classroom through communication with experts in the community, region, or nation.	
Teacher designs projects to engage students in conducting research, discussing ideas, and developing their own products such as essays, reports, presentations, and tangible artifacts.	
Teacher frames and communicates learning goals.	
Teacher models effective use of technology when framing and communicating goals and expectations.	
Students are engaged in completing the project work.	

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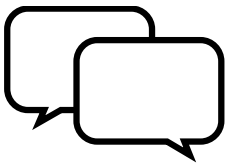
Students are engaged during project launch.	

3. Once you have reviewed all the activity directions, return to the course to view the look-for video. Click the "Next" arrow to go to the look-for evidence screen. Click the "Continue" button when prompted.
4. When the video player appears, choose the option that best matches your connection speed (Dial-up (56K) or Broadband).
5. After viewing the video, answer the following questions:

    a. Where do your current practices align with the exemplar video? Please describe your current successes.

    b. Realizing that the exemplar video for evidences for this look-for were designed to illustrate the highest level of performance, consider challenges you would face in implementing them and how you would overcome them.

Personal Notes for Implementation:



Prediscussion Activity (49):
Project Scope
Estimated Time: 10 minutes

In this activity you will identify project scope as it relates to your current and future projects, in preparation for an online discussion

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1. Review the following chart related to project scope.

Limited ⟷ **Ambitious Project**

Duration	Five to ten days	Most of the semester
Breadth	One topic, One standard	Multiple disciplines, Multiple standards
Technology	Used for communication, recording student input, presentation, or publication	Threaded throughout the project for instruction, student communication, analysis, creating content, journaling, outreach to experts, global collaboration, reporting, presenting, and publishing.
Outreach	Classroom-based	Community-based
Partnership	One teacher	Multiple teachers and community members
Audience	Classroom or school	Expert panel

2. Respond to the following reflections:

   a. How would you describe your current projects in relation to the continuum?

   b. Where are you meeting the "limited" criteria in your current projects?

   c. Where are you meeting the "ambitious" criteria?

   d. With the understanding that ambitious is not always better, how can you work to find a confluence where your competence to create and manage and your students' competence to perform come together?

   e. What potential benefits can you see of managing scope? If scope is not managed, what are the drawbacks?

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3. For the purpose of the online discussion, summarize your responses in the space provided.

4. Return to the course and advance to the next screen in order to receive further instructions for the online discussion activity.

Personal Notes for Implementation:

Course Activity (52):
Know and Need to Know
Estimated Time: 10 minutes

In this activity, you will focus on the value gained from conducting a "know/need to know" activity at the onset of a project.

1. Respond to the following reflection questions based on your knowledge of "know/need to know" activities and the content provided in this course.

   a. What benefits exist from having students identify existing knowledge and knowledge that must be acquired during a project? Why should this be a consideration during the project conception phase?

   b. How can teachers extend the "know/need to know," to encourage higher order thinking skills?

   c. How can technology enhance the impact of the "know/need to know" list generation?

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d. How can technology be a transparent tool for continual journaling, collaborating, communicating, researching, creating, planning, assessing, analyzing, adjusting, presenting, and publishing?

2. Map out a "know/need to know" activity that incorporates higher level technology infusion in the space below.
3. Return to the course to continue.

Personal Notes for Implementation:

Topic 3.1.2: How Do I Create the Project Plan?

Course Activity (45):
Look-for Video Review Guide: Project Plan
Estimated Time: 10 minutes

In this activity you will review the look-for video on project planning; then, reflect on your level of application of the classroom look-for indicators.

1. Read all the questions and instructions in this activity before beginning the activity. When prompted in the activity directions below, you will return to the course to view the look-for video. While viewing the video, you will complete item #2 below. After viewing the video, you will complete the remaining items for this activity in your Learning Guide.
2. As you watch the classroom look-for video, complete the "Project Plan Video Review" table. Add notes to the "Personal Observations" column, identifying what the teacher and/or students are doing or saying that supports each evidence statement.

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Evidences	Personal Observation
Teacher requires identification, analysis and synthesis of information to answer the Driving Question. It cannot be answered with a simple "yes" or "no."	
Teacher provides students with timely lessons and resources, or coaches them to find their own, in order to build knowledge of content and to develop skills.	
Teacher purposefully plans for students to be engaged in research: mining the Internet, scanning library resources, and talking with outside experts and/or community members.	
Teacher provides feedback to students on the quality of their products and performances before the final exhibition or presentation.	
Teacher creates various assessment tools such as rubrics, scoring guides, criteria checklists, and tests.	
Teacher requires students to demonstrate a variety of knowledge, skills, and competencies through artifacts and performances.	

3. Once you have reviewed all the activity directions, return to the course to view the look-for video. Click the "Next" arrow to go to the look-for evidence screen. Click the "Continue" button when prompted.
4. When the video player appears, choose the option that best matches your connection speed (Dial-up (56K) or Broadband).
5. After viewing the video, answer the following questions:

    a. Where do your current practices align with the exemplar video? Please describe your current successes.

    b. Realizing that the exemplar video for evidences for this look-for were designed to illustrate the highest level of performance, consider challenges you would face in implementing them and how you would overcome them.

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Personal Notes for Implementation:

Course Activity (58):
Crafting a Driving Question
Estimated Time: 20 minutes

In this activity, you will hone your skills in creating effective driving questions.

1. Save and review the *Driving Question Template*. You will use this tool for future activities, as well as to develop your own driving questions.
2. Based on the *Craft the Driving Question* reading and criteria provided in the *Driving Question Template*, analyze a sample driving question using the table below:

Driving Question	Why it Is flawed	Improved Example	Why it Is Better
How is DNA evidence used to fight crime?			

3. Compare your analysis with that of a project-based learning expert below.

Driving Question	Why it Is flawed	Improved Example	Why it Is Better
How is DNA evidence used to fight crime?	The real-world aspect makes this DQ somewhat interesting to students, but it is not open-ended; there is a "right answer."	Can we rely on DNA evidence to convict criminals?	There is no simple answer to this question, and its critical thinking element will increase student engagement. Students will learn the same material, but have to make a decision.

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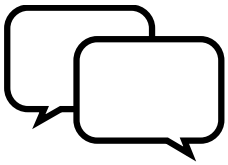
4. Respond to the following questions:

    a. How did your analysis compare with that of the expert? Explain the similarities and differences that you found, and provide your rationale.

    b. How can you make your driving questions more meaningful?

5. Consider the critical role that driving questions play in effective PBL. Describe the impact that both poorly designed and well designed driving questions have on project success in your **Learning Log,** by clicking on "Resources" and then "Learning Log." Label your entry "Crafting a Driving Question."
6. Close the Learning Log window to return to the course.

Personal Notes for Implementation:



Job-embedded Activity (59):
Driving Question Extended
Estimated Time: 20 minutes

In this activity you will extend your understanding of driving questions by developing a driving question from a small topic or lesson at your disposal.

1. Identify a small topic or lesson that you will be teaching in the near future.
2. Using the *Driving Question Template* provided in the previous activity, develop a meaningful driving question that meets the criteria.
3. As an optional extension of this activity, seek out collegial feedback by posting your driving question and rationale to the "Sharespace" tool. If you are unfamiliar, the tool can be accessed through your "Discussion" tab in the course resources area. Detailed directions are located in the "Help" section, which can be accessed from the "Discussion" tab and also from the Learner Console screen (from which you access and launch the course). Please keep in mind that even if you do not share your personal results, you are free to comment on those of your peers.

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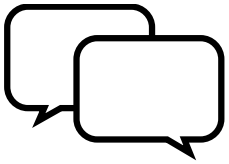
4. Implement your driving question.
5. Reflect on the experience, including successes and challenges, in the space below. If you utilized Sharespace, please share your experience and reflection in your posting.

6. Fill in the "L" and "D" columns of your *Project-Based Learning K-L-D Chart.*
7. Return to the course to continue.

Personal Notes for Implementation:



Prediscussion Activity (61):
Rubric Review
Estimated Time: 20 minutes

In this activity you will review and reflect on rubric examples in preparation for an online discussion.

1. Print and review the document entitled, *Rubric Review*.
2. Please respond to the following questions:

    a. What is a rubric?

    b. What knowledge about rubrics did your review of the example yield?

    c. How do you weigh different categories?

    d. What kind of language do/should you use when describing the different levels?

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3. For the purpose of the online discussion, summarize your responses in the space provided.

4. Return to the course and advance to the next screen in order to receive further instructions for the online discussion activity.

Personal Notes for Implementation:

Topic 3.1.3: How Do I Implement and Manage the Project?

Course Activity (64):
Look-for Video Review Guide: Project Implementation and Management
Estimated Time: 10 minutes

In this activity you will review the look-for video on project implementation and management; then, reflect on your level of application of the classroom look-for indicators.

1. Read all the questions and instructions in this activity before beginning the activity. When prompted in the activity directions below, you will return to the course to view the look-for video. While viewing the video, you will complete item #2 below. After viewing the video, you will complete the remaining items for this activity in your Learning Guide.
2. As you watch the classroom look-for video, complete the "Project Implementation and Management Video Review" table. Add notes to the "Personal Observations" column, identifying what the teacher and/or students are doing or saying that supports each evidence statement.

Evidences	Personal Observation
Teacher structures activities that require that student groups have leaders and task specialization.	

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Teacher expects that collaboration in class be enhanced, furthered, and documented via the class wiki or blog, or other online tool.	
Teacher helps students manage conflicts within a group.	
Teacher structures the classroom so that it permits students to work together on a set of activities designed to answer the Driving Question and accomplish the goals of the project.	
Teacher expects students to learn different things that are shared with others, and/or to employ different skills which are contributed to the group effort, in order to accomplish project activities.	

3. Once you have reviewed all the activity directions, return to the course to view the look-for video. Click the "Next" arrow to go to the look-for evidence screen. Click the "Continue" button when prompted.
4. When the video player appears, choose the option that best matches your connection speed (Dial-up (56K) or Broadband).
5. After viewing the video, answer the following questions:

    a. Where do your current practices align with the exemplar video? Please describe your current successes.

    b. Realizing that the exemplar video for evidences for this look-for were designed to illustrate the highest level of performance, consider challenges you would face in implementing them and how you would overcome them.

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Personal Notes for Implementation:

Course Activity (68):
Sample Entry Document
Estimated Time: 15 minutes

In this activity you will review a sample entry document and develop one of your own.

1. Review the sample entry document below using the following criteria:

    a. Document looks/sounds authentic or real.
    b. Problem at hand is challenging.
    c. The entry document creates a sense of urgency.
    d. The entry document plants the seeds of the content you want students to know.

Sample Entry Document

This document, taking the form of an email, was developed for a High School economics course.

TO:	Special Task Force of the Council of Economic Advisors
FROM:	President of the United States
RE:	Policy Recommendations for Current Economic Crisis

As you know, we are currently confronted by an economic crisis due to recent oil supply shocks and the rapid rise in oil prices. As a result, we are facing:

- High level of unemployment (12.5%) affecting all sectors of the economy–even middle managers are now losing jobs at increasing rates and homelessness is rising rapidly in urban areas
- High rate of inflation (9% annually)–people are concerned about being able to afford basic necessities, while businesses are contracting
- Dramatic slowing of economic growth in the past two quarters–real GDP has dropped by 13%

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I am hearing a great deal of criticism from all sides about how we're not dealing strongly enough with this–my approval ratings have plummeted. We need to develop an economic policy that will solve the economic crisis, a task for which I have convened this special task force of the Council of Economic Advisors. Of course, any policy we develop cannot increase our already-too-high national debt.

Once you have developed your policy, prepare a presentation, using visuals, that explains and justifies your policy. A written summary of your presentation must be on my desk before it is presented. You will deliver the presentation to me and a panel of representatives of different constituencies. We need to get feedback on whether or not voters will find the policy acceptable, a critical necessity if I am to have a hope of being reelected this year. The panel will ask you questions and expect you to defend your plan. If your recommendations are accepted by this group, I will use your ideas as the basis for a speech to the nation the following week.

2. Using the template below, create your own email formatted entry document that will kick off a project on your selected topic. If you would like your document to take another format, please be sure to explain your rationale.

Entry Document

TO:	Special Task Force of the Council of Economic Advisors
FROM:	President of the United States
RE:	Policy Recommendations for Current Economic Crisis

3. How does your sample entry document meet the following criteria?

   - Document looks/sounds authentic or real.

   - Problem at hand is challenging.

   - The entry document creates a sense of urgency.

   - The entry document plants the seeds of the content you want students to know.

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4. Consider what constitutes an "authentic document," and how can you make your documents truer to the real-world. Enter your thoughts in your **Learning Log** by clicking on "Resources" and then "Learning Log." Label your entry "Sample Entry Document."
5. Close the Learning Log window to return to the course.

Personal Notes for Implementation:

Job-embedded Activity (70):
Classroom Management Implementation
Estimated Time: 50 minutes

In this activity you will review a sample project calendar and will develop your own project calendar to assist you in the management of a small project on your selected topic.

1. Print and review the *Project Calendar*.
2. Using your selected topic, develop a tentative schedule for your project in the table below. Keep in mind that you should start small; don't be overly ambitious.

PROJECT WEEK ONE				
Monday	Tuesday	Wednesday	Thursday	Friday

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PROJECT WEEK TWO				
PROJECT WEEK THREE				

3. As you begin to implement your schedule, keep a record of your challenges and successes in the space below.

4. Return to the course to continue.

Personal Notes for Implementation:

Topic 3.1.4: How Do I Extend the Project Through Discussion, Extension, and Reflection?

Course Activity (72):
Look-for Video Review Guide: Project Reflection
Estimated Time: 10 minutes

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In this activity you will review the look-for video on project reflection then reflect on your level of application of the classroom look-for indicators.

1. Read all the questions and instructions in this activity before beginning the activity. When prompted in the activity directions below, you will return to the course to view the look-for video. While viewing the video, you will complete item #2 below. After viewing the video, you will complete the remaining items for this activity in your Learning Guide.
2. As you watch the classroom look-for video, complete the "Project Reflection Video Review" table. Add notes to the "Personal Observations" column, identifying what the teacher and/or students are doing or saying that supports each evidence statement.

Evidences	**Personal Observation**
Teacher models strategies, procedures, rituals, and forms to facilitate student reflection and analysis.	
Students record plans for changes in future project behavior.	

3. Once you have reviewed all the activity directions, return to the course to view the look-for video. Click the "Next" arrow to go to the look-for evidence screen. Click the "Continue" button when prompted.
4. When the video player appears, choose the option that best matches your connection speed (Dial-up (56K) or Broadband).
5. After viewing the video, answer the following questions:

    a. Where do your current practices align with the exemplar video? Please describe your successes.

    b. Realizing that the exemplar video for evidences for this look-for were designed to illustrate the highest level of performance, consider challenges you would face in implementing them and how you would overcome them.

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Personal Notes for Implementation:

Course Activity (72):
Planning for Evaluation and Reflection
Estimated Time: 20 minutes

In this activity, you will evaluate different assessment tools and select one to be used during the reflection period of your next project.

1. Print and read *The Fishbowl Method* and *End of Project Self Assessment*.
2. After reviewing the documents, please respond to the following questions to structure your evaluation:

    a. Of the assessment tools provided, which will you plan to use in your next project? Provide rationale for why these tools were selected.

    b. How could you use technology to achieve deeper reflection? Provide a specific strategy to be used and an explanation.

    c. What additional benefits could technology have in the reflection process?

    d. What other questions or ideas do you have about reflection in PBL?

3. As an optional extension of this activity, post additional reflection activities that would be effective in a PBL classroom to the "Sharespace" tool. If you are unfamiliar, the tool can be accessed through your "Discussion" tab in the course resources area. Detailed directions are located in the "Help" section, which can be accessed from the "Discussion" tab and also from

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the Learner Console screen (from which you access and launch the course). Please keep in mind that even if you do not share your personal ideas, you are free to comment on those of your peers.

4. Return to the course to continue.

Personal Notes for Implementation:

Topic 3.1.5: How Do I Create a Balanced 21st Century Project-Based Learning Experience?

Course Activity (78):
Project Plan
Estimated Time: 45 minutes

In this activity you will complete a project planning form focusing on a topic that you plan to teach in the near future. Please feel free to incorporate various pieces that you have developed throughout this course.

1. Print and complete the *Project Planning Form.*
2. Reflect on your experience in completing the form in the space provided below. Please include your thoughts on when student-centered, teacher-centered, and learning-centered environments are most useful and efficacious in project-based learning environments.

3. Fill in the "L" and "D" columns of your *Project-Based Learning K-L-D Chart.*
4. Return to the course to continue.

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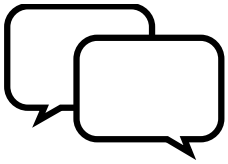
Personal Notes for Implementation:



Sync Point Discussion Activity (79):
Unit 3
Estimated Time: 45 minutes

Now that you have reached the end of this unit, you will take part in a sync point discussion with other members of your study group. There are two different ways this can occur:

1. **Option 1 (preferred):** Your study group will be asked to meet for a 1 hour face-to-face meeting with your facilitator, or
2. **Option 2:** Your study group will have an online sync point discussion.

Your facilitator will contact you to let you know which option you are using for the end of this unit. Once you are notified, please follow the corresponding instructions below:

Option 1 Instructions: Face-to Face Sync Point Meeting

This option will have you meet with your study group members and your facilitator for a 1 hour face-to-face meeting. For this meeting, be prepared to discuss with the group:

a. Research findings - as well as the teacher and student experience - illustrate the transforming power of differentiated instruction. As you reflect upon the course activities from Unit 3, identify the challenges and benefits you and your students might face by teaching with a differentiated philosophy.
b. Please also describe where higher order technology fits into differentiated instruction.
c. What have you learned and what insights gained from this unit?
d. What unanswered questions have been raised in your mind?

Your facilitator will let you know where and when this meeting will occur. Follow his/her instructions. Be sure to participate conscientiously, as part of your course grade will be based on your contribution to this discussion.

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Option 2 Instructions: Online Sync Point Discussion

This option will have you discuss topics from this unit with others in your study group online.

1. You will be notified when your facilitator has posted a topic for this discussion. You can not complete this activity until he/she has done so. Be sure to check your Inbox regularly.
2. Open the discussion group by clicking on the "Course Resources" menu on the top left of the screen and selecting "Discussion."
3. In the discussion page, select the "Sync Point" discussion group and look for your facilitator's posting for Unit 3.
4. You must post a response to your facilitator's topic and also either reply to the postings of others, or ask them questions. If you choose, you may start a new, related topic to discuss a specific concept in more detail. A study group discussion is a key element of the course and much can be learned from participating. Part of your grade will be based on the quality and frequency of your participation in these discussions.
5. Return to this discussion frequently to monitor the discussion and add your inputs. Bear in mind that the quiz at the end of the unit will in part be based on this discussion.
6. Close the browser window to return to the course.

Personal Notes for Implementation:

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UNIT 3 RUBRIC(S)

RUBRIC FOR UNIT 3 ESSAY QUESTION				
	Performance Levels			
	Advanced	**Proficient**	**Emerging**	**Novice**
Summary of the Four Look-for Principles of Project-Based Learning	Summaries are clear, well developed, and show an in-depth understanding of each of the four principles of project-based learning.	Summaries are clear, adequately developed, and show in-depth understanding of at least two of the four principles.	Summaries are clear, and show partial understanding of one of the four principles.	Summaries show only partial understanding of one of the four principles, or no understanding of any of the four principles.
Description of How Project-Based Learning and Higher Order Technology Tools can Increase Student Achievement and Engagement	Provides detailed and persuasive description that connects each of the four look-for principles of project-based learning to student learning and engagement, and how these connections could enhance both conventional and authentic measures of student achievement, including ways to effectively utilize higher order technology.	Provides detailed and persuasive description that connects at least three of the four look-for principles of project-based learning to student learning and engagement, and how these connections could enhance both conventional and authentic measures of student achievement, including effective ways to use higher order technology.	Provides adequate, though less detailed or persuasive, description that connects two or more of the four look-for principles of project-based learning to student learning and engagement, and how these connections could enhance either conventional or authentic measures of student achievement.	Provides a description that connects any of the four look-for principles of project-based learning to student learning and engagement, or how these connections could enhance either conventional or authentic measures of student achievement, *or* provides no description at all.

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Examples of How Current Instruction Can Be Modified to Include the Five Look-for Principles of Inquiry-Based Instruction	Provides three or more clear and concise examples of how current instruction can be modified to include the four look-for principles of project-based learning.	Provides at least two clear and concise examples of how current instruction can be modified to include the four look-for principles of project-based learning.	Provides at least one clear and concise example of how current instruction can be modified to include the four look-for principles of project-based learning.	Provides an example of how current instruction can be modified to include the four look-for principles of project-based learning, but the explanation lacked depth, or provided no examples.
Examples of How Higher Order Technology Will Be Infused into Upcoming Inquiry-Based Lessons	Clear explanation of how each use of higher order technology promotes a specific look-for principle of project-based learning for the purpose of "creation" and "analysis," as described in the *Range of Instructional Practice* chart.	Clear explanation of how most uses of higher order technology would promote one or more look-for principle of project-based instruction for the purpose of "creation" and "analysis," as described in the *Range of Instructional Practice* chart.	Connections between uses of technology and standards of authentic instruction are not explained, but at least some of the examples of higher order technology use are very likely to support one or more look-for principle of project-based instruction. Higher order technology use aligns with the "apply" and "analyze" levels of the *Range of Instructional Practice* chart.	Uses of technology are not likely to support any look-for principle of project-based instruction, and are at the "remember" and "understand" levels designated in the *Range of Instructional Practice* chart.
Conventions	Excellent evidence of correct spelling, grammar, mechanics, usage, and sentence formation—no more than two errors.	Adequate evidence of correct spelling, grammar, mechanics, usage, and sentence formation—no more than five errors.	Some evidence of correct spelling, grammar, mechanics, usage, and sentence formation—no more than 10 errors.	Limited evidence of correct spelling, grammar, mechanics, usage, and sentence formation—more than 10 errors.

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UNIT 4: TEACHER ACTION RESEARCH

UNIT 4 ACTIVITY AND DOCUMENT BREAKDOWN

Titles	Estimated Time	Objectives Identified	Activity Number
4.1.1 Course Activity: Teacher Action Research K-L-D Chart	5 minutes	N/A	(80)
4.1.1 Multimedia Segment	1 minute	4, 5, 6, 7	
4.1.1 Multimedia Segment	4 minutes	4, 5, 6, 7	
4.1.2 Action Research Resources • Video: How to Develop an Action Research Question • Video: Additional Examples of areas of Inquiry • Article: *A Passion for Inquiry in an Era of 'Right Answers': Inquiring about Teachers Inquiring about Their Practice*	28 minutes	4, 5, 6, 7	
4.1.2 Course Activity: Research Inquiry Topic	30 minutes	4, 5, 6, 7	(84)
4.1.3 Multimedia Segment	0.5 minutes	4, 5, 6, 7	
4.1.3 Action Research Resources • Video: Types of Student Data to Collect • Video: How to Analyze Student Data • Article: *Effective Use of Assessment Data in Action Research* • Article: *Instructional Implications of Student Data Assessment*	39 minutes	4, 5, 6, 7	
4.1.3 Job-embedded Activity: Assessment Data Collection	25 minutes	4, 5, 6, 7	(87)
4.1.3 Job-embedded Activity: Identify Instructional Needs	75 minutes	4, 5, 6, 7	(88)
4.1.4 Multimedia Segment	0.5 minutes	4, 5, 6, 7	
4.1.4 Action Research Resources • Video: How to Plan and Deliver Instruction Based on Individual Student Needs • Article: *Connecting Action Research to Individual Student Needs*	5.5 minutes	4, 5, 6, 7	
4.1.4 Prediscussion Activity: Individual Student Needs	10 minutes	4, 5, 6, 7	(91)
4.1.4 Discussion Activity: Individual Student Needs	20 minutes	4, 5, 6, 7	
4.1.5 Multimedia Segment	0.5 minutes	4, 5, 6, 7	
4.1.5 Action Research Resources • Video: How to Progress Monitor and Post Assess • Article: *Progress Monitoring and Post Assessment*	11.5 minutes	4, 5, 6, 7	
4.1.5 Job-embedded Activity: Progress Monitoring and Post Assessment	50 minutes	4, 5, 6, 7	(95)
4.1.6 Multimedia Segment	0.5 minutes	4, 5, 6, 7	

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4.1.6 Action Research Resources • Video: How to Determine Instructional Implications • Video: Action Research Case Studies • Article: *How Do I Determine Instructional Implications?* • Article: *Action Research Case Studies*	33.5 minutes	4, 5, 6, 7	
4.1.6 Job-embedded Activity: Identifying Instructional Implications	35 minutes	4, 5, 6, 7	(98)
4.1.7 Multimedia Segment	0.5 minutes	4, 5, 6, 7	
4.1.7 Action Research Resources Video: How to Collaborate with Peers … Article: *Study Group Protocols for Sharing Action Research*	12.5 minutes	4, 5, 6, 7	
4.1.7 Job-embedded Activity: Sharing with Peers	30 minutes	4, 5, 6, 7	(101)
4.1.7 Course Activity: Classroom Look-fors End of Course Self-assessment	30 minutes	4, 5, 6, 7	(102)
4.1.7 Sync Point Discussion (Graduate, CPE Versions/Blended Study Group Version)	60/180 minutes	4, 5, 6, 7	(103)
Unit 4 Essay Question (excluding Self-study Version)	35 minutes	4, 5, 6, 7	
Unit 4: Estimated Time Total	**9 hours & 3 minutes**	**Graduate, CPE Versions**	
	11 hours & 3 minutes	**Blended Study Group Version**	
	5 hours & 38 minutes	**Self-study Version**	

Note: If you have previously taken a course in which you have read any of the articles or viewed any of the videos found in Unit 4, you will not need to read/view them again. This will reduce the time needed to complete this unit. However, you must still complete all activities.

Unit Overview:

In this unit you will define and incorporate the cycle of action research. Next, you will identify a pressing question of concern in the classroom and collect the necessary assessment data needed to explore the concern. Then, you will analyze and synthesize the data to develop a plan of action. Instruction will be planned and delivered, and progress monitoring will be ongoing. Information from the progress monitoring will provide insight on instructional implications. The final step of the cycle involves the collaboration and sharing of research with peers. As a result of the action research, you will identify areas to improve instructional outcomes.

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Section 4.1: Teacher Action Research

Topic 4.1.1: What Is Action Research?

Course Activity (80):
Teacher Action Research K-L-D Chart
Estimated Time: 5 minutes

In this activity you will reflect on what you already know regarding the teacher action research cycle.

1. Print the *Teacher Action Research K-L-D Chart*.
2. Complete the "K" column of the chart, recording what you already know about the topic.
3. Save the chart for later use. You will be directed when to fill in the "L" and "D" columns. This information will be used to complete the culminating activity.
4. Return to the course to continue.

Personal Notes for Implementation:

Topic 4.1.2: How Do I Develop an Action Research Question?

Course Activity (84):
Research Inquiry Topic
Estimated Time: 30 minutes

Complete an activity in which you will engage in a guided inquiry exercise designed to help you identify an appropriate question or pressing issue to begin your action research, based upon the course content.

1. Answer the following questions. (Refer to the "Look-fors" document from Unit 1 to help you develop a question or wondering related to the course content.)

    a. Reflect upon the students in your classroom.

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- Are there one or two students who stand out in your mind immediately who are puzzling to you? For example, do these students struggle to find solutions to problems or discover new meanings through using 21st Century technology?

- Do these students have a difficult time demonstrating their understanding? Describe a student centered concern, question, or wondering that will be enhanced through project-based learning.

- To what degree are students comfortable conducting research and analyzing sources critically?

b. Reflect upon the class content and curriculum as related to project-based learning.

- Are there issues or gaps in the success of a unit of study that concern you? Explain.

- Is your content knowledge strong enough that you expose students to fewer topics, but in a more systematic and connected manner? Explain.

- Do you promote student understanding of information over memorization? Explain.

- Where could you include higher order or participatory technology as described in the *Range of Instructional Practice* tool? Who could you ask for help?

- Do you consistently challenge students to inquire, to think critically, to think at higher levels (per Bloom's Taxonomy or the Three Story Intellect)? Describe.

- Do you plan projects that lead toward authentic assessments? Describe.

c. Reflect upon your beliefs about teaching.

- Does your teaching philosophy align with your actual teaching practice? Where do you see discrepancies?

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- Do you encourage students to take risks, ask questions, help each other, and build upon each others' knowledge? Please explain.

d. Reflect on your answers to the previous questions to identify a research inquiry topic. Please state the action research question that you would like to explore in the following format:

   One thing about project-based learning I'd like to explore is…

2. Briefly summarize your rationale for selecting the inquiry that you stated in the space provided. Be prepared to add the summary to your Learning Log.

3. Enter your summary in your **Learning Log** by clicking on "Resources" and then "Learning Log." Label your entry "Research Inquiry Topic."
4. Close the Learning Log window to return to the course.

Personal Notes for Implementation:

Topic 4.1.3: What Student Assessment Data Should I Collect and How Should I Analyze it?

Job-embedded Activity (87):
Assessment Data Collection
Estimated Time: 25 minutes

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In this activity you will create a data collection chart similar to the sample provided. You will use the chart to identify and collect the necessary assessment data based on your previously identified action research question.

1. Print and review the *Assessment Data Collection Chart*.
2. Using the template provided, create a similar chart based upon your personal action research inquiry identified in the previous activity. This chart will include the information needed to answer the question, and the data collection strategies that will generate this information.
3. Based upon your chart, begin collecting your classroom data.
4. Answer the following questions:

    a. Action research requires nontraditional forms of data to be collected. Was it difficult to identify nontraditional forms of data?

    b. Did you ask for assistance from a colleague? If so, please describe your colleague's involvement in identifying or selecting nontraditional forms of data.

    c. Describe your process for selecting nontraditional forms of data for your action research.

    d. Using multiple sources of data and multiple strategies for collecting data will enhance your inquiry as you gain different perspectives. What forms of nontraditional data did you collect and why did you select them?

    e. Describe the insight that you gained from gathering nontraditional forms of data. What surprised you or what new ideas were generated?

    f. What higher order technology-based assessment data could be utilized and considered as nontraditional forms of data? How and where could you incorporate higher order participatory technology into the collection process? How and where could you incorporate higher level or participatory technology in the analysis process? How might the ability of technology to facilitate collaboration and create a record enhance and deepen your data assessment?

5. Summarize your responses in the space provided. Be prepared to add the summary to your **Learning Log**.
6. Enter your summary in your **Learning Log** by clicking on "Resources" and then "Learning Log." Label your entry "Assessment Data Collection."
7. Close the Learning Log window to return to the course.

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Personal Notes for Implementation:

Job-embedded Activity (88):
Identify Instructional Needs
Estimated Time: 75 minutes

In this activity you will analyze the data collected in your classroom using the four steps in the *Data Assessment Analysis*. This information will help you identify instructional needs.

1. Print the *Data Assessment Analysis*.
2. Complete the *Data Assessment Analysis* as directed in the instructions to work through the data that has been collected.
3. Once you have completed the "Data Assessment Analysis," answer the following questions.

    a. What was the most challenging aspect of the data analysis process to inform instruction? How did you overcome the challenges?

    b. What are some individual student needs based on the data analysis? How did you arrive at your conclusions?

4. Summarize your responses in the space provided. Be prepared to add the summary to your Learning Log.

5. Enter your summary in your **Learning Log** by clicking on "Resources" and then "Learning Log." Label your entry "Identify Instructional Needs."
6. Close the Learning Log window to return to the course.

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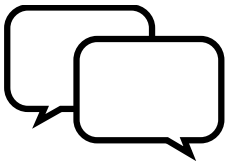
Personal Notes for Implementation:

Topic 4.1.4: How Do I Plan and Deliver Instruction Based on Individual Student Needs?



Prediscussion Activity (91):
Individual Student Needs
Estimated Time: 10 minutes

In this activity you will reflect on your planning and delivery of instruction based on individual student needs in your classroom. **While you are expected to focus on your individual students, you must keep their identities anonymous.**

1. Respond to the following questions to guide your thoughts.

    a. Without naming actual student names, how would you describe the unique social, emotional, or academic need that you have identified for a particular student?

    b. How will you address this specific need? Who could you ask for assistance? How will you gauge success?

2. Based on what you know about your students' needs and the research question that you identified at the beginning of this unit, consider the following Web 2.0 technologies: wiki, blog, podcast, vodcast, and RSS feed.

    a. Choose a specific Web 2.0 technology from the list that you have not used before in a classroom setting.

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b. Design instruction around this technology to meet the need of your research question. Use the resources provided throughout this course to guide you on how to use the technology, and also how to use the technology to elicit higher level thinking in your students. Consider consulting your instructional technology specialist for additional implementation ideas. There are also online communities of teachers using technology to further their instructional goals, such as Classroom 2.0 (http://www.classroom20.com).

c. Deliver your instruction, using this technology with your students. How have you been able to involve your students in hands-on use of this Web 2.0 tool so it is not just an instructional tool, but also a learning participatory tool?

3. For the purpose of the online discussion, summarize your experience in determining how to meet the individual needs of this particular student in the space provided. Please include what was challenging, but more importantly, the benefits and what you learned during the process.

4. Fill in the "L" and "D" columns of your *Teacher Action Research K-L-D Chart*.
5. Return to the course and advance to the next screen in order to receive further instructions for the online discussion activity.

Personal Notes for Implementation:

Topic 4.1.5: How Do I Progress Monitor and Post Assess?

Job-embedded Activity (95):
Progress Monitoring and Post Assessment
Estimated Time: 50 minutes

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In this activity you will identify key progress monitoring and post assessment points, and provide rationale for their selection. Then you will design and implement your own progress monitoring and post assessment system.

1. Print the *Guide to Progress Monitoring and Post Assessment*.
2. Based upon the progress monitoring and post assessment guide and the following questions, design a system to progress monitor and post assess.

    a. What types of diagnostic tools will you utilize to identify where students are academically?

    b. What types of formative or progress monitoring assessment will be incorporated? For what purpose(s)? Will these formative types be formal, informal, or both, and will they be graded or ungraded?

    c. It is important for students to become partners in their own education. What techniques or strategies will encourage and maintain student involvement in order to keep students informed and actively engaged in improving their academic achievement?

    d. Students can use self-reflection to gain insight into their own learning and to foster awareness and change. What do you propose as methods for students to reflect upon their work? How will you guide students to move beyond the reflection step?

    e. What types of post assessment will be incorporated? For what purpose(s)? How will you gauge the success of the instruction based upon the student results?

    f. How do you see higher order technology used during the progress monitoring and post assessment process?

3. Summarize your responses in the space provided. Be prepared to add the summary to your Learning Log.

4. Enter your summary in your **Learning Log** by clicking on "Resources" and then "Learning Log." Label your entry "Progress Monitoring and Post Assessment."
5. Close the Learning Log window to return to the course.

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Personal Notes for Implementation:

Topic 4.1.6: How Do I Determine Instructional Implications?

Job-embedded Activity (98):
Identifying Instructional Implications
Estimated Time: 35 minutes

In this activity you will identify the instructional implications from your progress monitoring and post assessment. Then, you will identify the implications of your instruction for the purpose of sharing your learning with colleagues in the next step.

1. Locate the progress monitoring and post assessment data identified in the previous section.
2. Identify the implications from your instructional adjustments in the "plan and deliver" phase, using the following questions:

    a. Was there an increase or decrease in student achievement? Discuss the issues and implications.

    b. What affect did your instructional practices have on the outcomes?

    c. What impact will your research findings have on your instructional practices?

    d. What exactly did you learn from the research and what does it mean in terms of your project-based learning practices? What changes will you make as a result of your findings?

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e. What would be the most valuable information for your colleagues to know? What would be helpful information to share? What suggestions would you offer colleagues?

f. Did you notice any difference with your students when they were actively engaged with higher order technology? (Note: One of the benefits of technology is that, generally, students are more engaged and motivated when they are allowed to use higher order technology tools. In addition, technology offers a record of the process which can be viewed from multiple locations and can help students see and understand the arc of their own learning.)

3. Summarize your responses in the space provided. Be prepared to add the summary to your Learning Log.

4. Enter your summary in your **Learning Log** by clicking on "Resources" and then "Learning Log." Label your entry "Identifying Instructional Implications."
5. Close the Learning Log window to return to the course.

Personal Notes for Implementation:

Topic 4.1.7: How Can I Collaborate with Peers to Share the Results and What I Learned from My Action Research?

Job-embedded Activity (101):
Sharing with Peers
Estimated Time: 30 minutes

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In this activity you will collaborate with your peers and share your action research findings with them. This can be conducted with a small group of peers who work at your school but who are not participating in this course. For an advanced application, try conducting this activity using online collaboration tools. Consult your technology coordinator for additional help.

1. Consolidate the information that you gathered through your action research.

    a. What were your key findings?

    b. What recommendations would you make to your peers to help them improve instruction or student achievement?

    c. What unanswered questions do you have stemming from your research, about which you could ask your colleagues' help in finding answers and solutions?

2. Identify three to six peers who are not taking the course, and the environment in which you will meet to share your findings with them.

    a. Identify the necessary participants.

    b. Identify and secure the location for your meeting.

    c. Identify the time for the meeting.

    d. Produce an informal agenda and communicate the meeting information identified (time, locale, etc.).

3. Conduct the meeting and take notes during the meeting in the space provided. Finally, add the summary to your Learning Log.

4. Enter your summary in your **Learning Log** by clicking on "Resources" and then "Learning Log." Label your entry "Sharing with Peers."
5. Close the Learning Log window to return to the course.

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Personal Notes for Implementation:

Course Activity (102):
Classroom Look-fors End of Course Self-Assessment
Estimated Time: 30 minutes

In this activity you will conduct an assessment focusing on your understanding of project-based learning. When you have finished, you will compare your results to the preassessment taken at the beginning of the course.

1. Print and complete the *Project-based Learning Classroom Look-fors Rubric*.
2. In the space below, use the following questions to summarize your findings.

    a. What areas of project-based learning did you find lacking in your evaluation of your instruction?

    b. What changes will you implement as a result of your evaluation?

    c. Whom could you ask for assistance in making changes? Describe your plan for implementing changes.

    d. How did higher order technology extend, enhance, enable, or deepen the lesson, or provide added motivation for your students?

3. Summarize your responses in the space provided. Be prepared to add the summary to your Learning Log.

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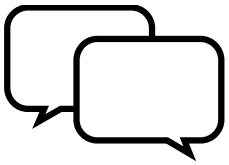
4. Enter a summary of the responses in your **Learning Log** by clicking on "Resources" and then "Learning Log." Label your entry "Classroom Look-fors End of Course Self-assessment."
5. Close the Learning Log window to return to the course.

Personal Notes for Implementation:



Sync Point Discussion Activity (103):
Unit 4
Estimated Time: 180 minutes

In this activity you will participate in a discussion with the other members of your study group regarding the key concepts considered in this unit.

1. You will be notified when your facilitator has posted a topic for this discussion. You cannot complete this activity until he/she has done so. Be sure to check your "Inbox."
2. Open the discussion group by clicking on the "Course Resources" menu on the top left of the screen and select "Discussion."
3. On the discussion page, select the "Sync Point" discussion group and look for your facilitator's posting for Unit 4.
4. You must **post a response** to your facilitator's topic, and also either **reply** to the postings of others, or ask them questions. If you choose, you may start a new, related topic to discuss a specific concept in more detail. A study group discussion is a key element of the course, and much can be learned from participating.
5. Return to this discussion frequently to monitor the discussion and add your input.
6. Close the browser window to return to the course.

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Personal Notes for Implementation:

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UNIT 4 RUBRIC(S)

RUBRIC FOR UNIT 4 ESSAY QUESTION

	Performance Levels			
	Advanced	**Proficient**	**Emerging**	**Novice**
Background Information/ Purpose/ Wondering(s)	The background section provides complete information about the context in which this action research took place (i.e., information about classroom, students, content, strategies, etc.). The root of the action researcher's question/wondering is explained in detail, and the explanation convinces the reader of its personal importance to the researcher. There exists a strong, clear connection between the action research project and readings on both action research and supporting project-based learning completed within and/or outside of this course. Finally, the purpose and question(s)/ wondering(s) are clearly articulated, free of educational jargon, are open-ended (i.e., the action researcher did not pose a question for which the answer was already known), are related to project-based learning and address a dilemma or issue that emerged for the action researcher in the attempt to translate what was learned in this course about project-based learning into his/her own classroom practice.	The background section provides complete information about the context in which the action research took place (i.e., information about classroom, students, content, strategies, etc.). The root of the action researcher's question is explained, but a convincing argument about the question's personal importance to the action researcher is lacking. There exists a moderate connection between the action research project and readings on both action research and supporting project-based learning completed within and/or outside of this course. Finally, the purpose and question(s)/ wondering(s) are related to project-based learning and address a dilemma or issue that emerged for the action researcher in the attempt to translate what was learned in this course about project-based learning into his/her own classroom practice, but the question(s)/ wondering(s) are not clearly articulated.	The background section provides incomplete information about the context in which the action research took place. The root of the action researcher's question is explained, but a convincing argument about the question's personal importance to the action researcher is lacking. There exists a minimal connection between the action research project and readings on both action research and supporting project-based learning completed within and/or outside of this course. Finally, the action researcher's purpose and question(s)/ wondering(s) are tangentially related to project-based learning.	The background section provides little or no information about the context in which the action research took place. The action research question is stated, but not explained. There is little or no reference to readings on action research or project-based learning completed in this course. The action researcher's purpose or question(s)/ wondering(s) is not related to project-based learning, are not clearly articulated, and/or the action researcher posed a question for which the answer was already known.

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Design of the Action Research	The action researcher collected three to five different sources of data (i.e., test scores, surveys, field notes, student work, interviews, anecdotal records, journal entries, etc.). There is a clear connection between the data collection plan and the question(s)/ wondering(s). Each data collection strategy employed is clearly explained. The action researcher includes a detailed explanation of all procedures and timeline for data collection, as well as an explanation of how data were analyzed.	The action researcher collected one or two different sources of data only. There is a clear connection between the data collection plan and the question(s)/ wondering(s). Each data collection strategy employed is clearly explained. The action researcher includes an explanation of all procedures and timeline for data collection, as well as an explanation of how data were analyzed.	The action researcher relied on one source of data only and/or the connection between the data collection plan and the question(s)/ wondering(s) is not clear. The action researcher includes a minimal explanation of the data collection and analysis strategy employed for the research.	There is no clear articulation of any data collection and analysis strategies and/or data collection and analysis was not completed in a planned, intentional, and systematic way. There is little or no connection between the data collection and the question(s)/ wondering(s).
Statements About what You Learned as a Result of the Action Research Process	This section provides thoughtful, clearly articulated learning statements, and each statement is supported in detail by data. If relevant, data may also be included that did not appear to fit with what the action researcher is claiming, with possible explanations for the discrepant data. The action researcher weaves readings and experiences completed both inside and outside of this course into the discussion of their findings as the readings and experiences relate to what was learned. The action researcher discusses not only what was learned about their topic of study, but includes a personal reflection on what was learned about the process of action research.	This section provides learning statements, and each statement is supported by data. The action researcher weaves readings and experiences completed in this course into the discussion of their findings as the readings and experiences relate to what was learned.	This section provides learning statements, but there is not a clear connection between the statements of learning made and the data the action researcher collected. There is little or no mention of the relationship of the action researcher's findings to any other readings or experiences.	The section provides learning statements, but the statements are not supported by data. There is little or no mention of the relationship of the action researcher's findings to any other readings or experiences.

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Conclusions and Implications for Future Practice	This section provides multiple detailed examples of instructional change the action researcher has made or will consider making based on the results of the teacher action research performed during this unit. In addition, the action researcher discusses action research that might be pursued in the future based on what was learned from the current action research process.	This section provides multiple detailed examples of instructional change the action researcher has made or will consider making, but the direct connection of these changes to what was learned is not clearly articulated. In addition, the action researcher discusses action research that might be pursued in the future based on what was learned from the current action research process.	This section provides limited examples of implications for instructional change based on the results of the teacher action research performed during this unit, and/or the examples provided are unrealistic and unconnected to the learning that occurred during the current action research cycle. Little attention is given to projecting future action research projects.	Provides no clear examples of implications for instructional change based on the results of the teacher action research performed during this unit. Does not discuss future action research.
Conventions	Excellent evidence of correct spelling, grammar, mechanics, usage, and sentence formation—no more than two errors.	Adequate evidence of correct spelling, grammar, mechanics, usage, and sentence formation—no more than five errors.	Some evidence of correct spelling, grammar, mechanics, usage, and sentence formation—no more than 10 errors.	Limited evidence of correct spelling, grammar, mechanics, usage, and sentence formation—more than 10 errors.

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UNIT 5: CULMINATING ACTIVITY

Unit Overview

In this unit, you will tie together all aspects of the course. You will synthesize the information learned in the course and consider how to use this information and data to improve your teaching skills.

Section 5.1: Plan, Step 1

As a result of this course, you are now able to:

- Distinguish between what project-based learning is and is not.
- Define, generate, and identify a high quality 21st Century project-based lesson and resources.
- Formulate a Driving Question based on real world application that incorporates authentic assessment.
- Create a classroom culture of inquiry, independence, autonomy, and responsibility that models 21st Century skills.
- Utilize reflective practices to restructure projects and celebrate accomplishments.
- Understand the transformative possibilities of technology for teaching and learning in the project-based learning classroom.
- Embrace and implement technology as infrastructure to facilitate learning through communication, collaboration, journaling, researching, reflection, creating, presenting, and publishing.

Learning should not end with this course. As a lifelong learner, you should continue to read professional journals, subscribe to blogs and podcasts, and access research so you are continually adding to your knowledge base about learning and teaching. The culminating activity for this course will engage you in taking the first steps.

Personal Notes for Implementation:

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Section 5.2: Plan, Step 2

In the culminating activity you will:

1. Circle one or two of the critical actions from the "D" column of the K-L-D Chart that you want to accomplish.
2. Write an action plan to implement or enhance the use of the strategies that support project-based learning in your classroom. Use the suggested changes you circled in the "D" column of your K-L-D Chart as the basic framework for your action plan. Use the following resources when developing your plan:

    - Your current school district curriculum
    - Ask yourself: What is already in place? Where are the gaps?
    - Information from your principal, colleagues, and stakeholders. How can these individuals assist you in implementing or improving your teaching methods?
    - Data you collected on students in your classroom
    - Quantitative data (ex. assessment scores)
    - Qualitative data (ex. observation in the classroom, interest surveys)
    - Based on the data, what are your students' strengths and areas of need?
    - The K-L-D Chart (prior knowledge, new learning, and ideas for implementation)
    - Ideas you gained from the narration, course documents, course activities, and online discussions
    - Notes, reflections, and responses to questions recorded in the Learning Guide

3. On which area of improvement will you focus?

4. What are the steps you will follow for your action plan? Be sure to include student experiences and activities as part of your plan. Please number your steps.

5. For each step in your plan, what resources will you need?

6. For each step in your plan, how will you gauge success?

7. Return to the course and prepare to submit your plan online.

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Personal Notes for Implementation:

Section 5.3: Reflect

Personal Notes for Implementation:

Section 5.4: Share

Personal Notes for Implementation:

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UNIT 5 RUBRIC(S)

RUBRIC FOR ACTION PLAN

	Performance Levels			
	Advanced	**Proficient**	**Emerging**	**Novice**
Identify an Area of Priority	Clearly states the priority chosen and gives in-depth reasons for the selection.	Clearly states the priority and gives some reasons for the selection.	The priority is stated and provides limited reasons for the selection.	The priority is stated but does not provide reason(s) for the selection.
Steps to Solution of the Analyzed Root Cause Problem	The steps are very clear and logical. There is strong evidence that the plan includes all components of project-based learning and introduces new/improved aspects of producing stronger results for students to the building/district.	The steps are clear and logical. There is ample evidence that the plan includes components of project-based learning and introduces new/improved aspects of producing stronger results for students to the building/district.	The steps are vague and contain only those things that should already be in place in the classroom/ building/ district. There is nothing new/improved for stronger results for students to the building/district.	The steps are unclear and/or illogic. Evidence suggests that the teacher does not really understand the components and no change was indicated for stronger results for students.
Resources for Each Step	Includes a comprehensive list of resources needed to complete the action plan and includes innovative uses of resources already available.	Additional resources are listed and appear to be reasonable in terms of educational goals and dollars spent. Some use of materials already available is included.	The additional resources show no link to the stated goal. There is no innovative use of current resources included in the plan.	The additional resources appear to be unnecessary and/or are unreasonable in terms of cost.

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Plan to Evaluate the Action Plan	The evaluation plan includes evidence of feedback from staff, peers, and supervisors (if applicable). Included are specific criteria on how each step of the plan will be evaluated. Also included will be the steps to analyze data on student achievement with the priority chosen.	The evaluation plan includes evidence of feedback from staff, peers, and supervisors (if applicable). Included are steps on how most of the steps of the plan will be evaluated and what assessment will be used to track student achievement on the priority chosen.	The evaluation plan includes no evidence of feedback from staff, peers, and supervisors (if applicable). Included are general statements about how the plan will be evaluated and an assessment is mentioned but does necessarily relate to the priority chosen.	The evaluation plan includes no evidence of feedback from staff, peers, and supervisors (if applicable). There are general statements about how the plan will be evaluated but no assessments are listed.
Conventions	Excellent evidence of correct spelling, grammar, mechanics, usage, and sentence formation—No more than two errors.	Adequate evidence of correct spelling, grammar, mechanics, usage, and sentence formation—No more than five errors.	Some evidence of correct spelling, grammar, mechanics, usage, and sentence formation—No more than 10 errors.	Limited evidence of correct spelling, grammar, mechanics, usage, and sentence formation—More than 10 errors.

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